# Five-Year Review Report

## Second Five-Year Review Report

## for

## G&H Landfill Site

## Shelby Township

## Macomb County, Michigan

## September 2006

**PREPARED BY:**

**United States Environmental Protection Agency**
**Region 5**
**Chicago, Illinois**

Approved by:

for Richard C. Karl
Director
Superfund Division

Date: 9/27/06

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**Attachments**

## List of Acronyms

| | |
|---|---|
| ARAR | Applicable or Relevant and Appropriate Requirement |
| BGS | Below Ground Surface |
| BTEX | Benzene, Toluene, Ethylbenzene, and Xylene |
| CD | Consent Decree |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| COC | Contaminants of Concern |
| CRA | Conestoga Rovers & Associates |
| DWSD | Detroit Water & Sewer Department |
| EPA | United States Environmental Protection Agency |
| ESD | Explanation of Significant Difference |
| FYR | Five-Year Review |
| IC | Institutional Control |
| ISVE/AS | In-situ Vapor Extraction/Air Sparge |
| MCHB | Macomb County Health Board |
| MCL | Maximum Contaminant Level |
| MCLG | Maximum Contaminant Level Goal |
| MDEQ | Michigan Department of Environmental Quality |
| MDNR | Michigan Department of Natural Resources |
| MWRC | Michigan Water Resource Commission |
| NCP | National Contingency Plan |

| | |
|---|---|
| **NPL** | National Priorities List |
| **OCHD** | Oakland County Health Department |
| **O&M** | Operation and Maintenance |
| **PAH** | Polyaromatic Hydrocarbon |
| **PNA** | Polynuclear Aromatics |
| **PCB** | Polychlorinated Biphenyl |
| **PEAS** | Pollution Emergency Alerting System |
| **PPB** | Parts per Billion |
| **PRP** | Potentially Responsible Party |
| **RA** | Remedial Action |
| **RAO** | Remedial Action Objective |
| **RD** | Remedial Design |
| **RI/FS** | Remedial Investigation/Feasibility Study |
| **ROD** | Record of Decision |
| **RPM** | Remedial Project Manager |
| **SVE** | Soil Vapor Extraction |
| **SVOC** | Semivolatile Organic Compound |
| **VOC** | Volatile Organic Compound |

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# Executive Summary

The G&H site is located in Shelby Township, Macomb County, Michigan, about 20 miles north of Detroit (Attachment 1). The site comprises approximately 60 acres of a former landfill, 30 acres of adjacent wetlands, and other impacted areas including a former junkyard. The site is bounded on the north by 23 Mile Road and on the east by Ryan Road. Residential areas are north of 23 Mile Road and east of Ryan Road, and the Clinton River runs through the Rochester-Utica State Recreational Area to the south and west.

From 1955 until 1973 G&H Industrial Landfill, Inc. accepted industrial waste oil, solvents, and municipal waste for disposal. State authorities noted groundwater contaminated with polychlorinated biphenyls (PCBs) seeping out of the landfill in areas south of the site, and prohibited further disposal of industrial solvents in the mid-1960's. The State of Michigan referred the site to U.S. EPA in 1982. U.S. EPA performed a site inspection and proposed the site for listing on the National Priorities List (NPL) in July 1982. The site's placement on the NPL was published in the Federal Register on September 8, 1983 (48 Fed. Reg. 40658).

U.S. EPA and Michigan Department of Environmental Quality (MDEQ) began a Remedial Investigation and Feasibility Study ("RI/FS") in 1984. Based on the findings of the RI/FS, U.S. EPA issued a Record of Decision ("ROD") on December 21, 1990 that called for a remedy comprising the following components:

- Installation of a modified RCRA Subtitle C landfill cover to prevent direct contact and reduce the rate of infiltration to the water table;
- Excavation of impacted soils from areas outside of the landfill cover and placement of these impacted soils beneath the landfill cover;
- Installation of a slurry wall around the landfill areas to physically contain the contents and a toe drain on the west side of the landfill to capture leachate for treatment;
- Installation of a groundwater extraction and treatment system to capture and hydraulically contain the landfill contaminants;
- Implementation of a monitoring program to assess the efficacy and progress of the groundwater cleanup;
- Restoration of impacted wetlands and establishment of new wetlands to replace those lost to contamination or remedy implementation;
- Compliance standards for groundwater outside of the landfill based on Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and State of Michigan criteria for protection of groundwater quality.

The remedy is currently protective of human health and the environment in the short term. The landfill cover, groundwater extraction and treatment system, and access controls are functioning as designed, and have achieved the remedial objectives, which include minimizing the migration of contaminants to groundwater and surface water and preventing direct contact with contaminants at the Site.

Long-term protectiveness of the remedy is dependent upon the continued effectiveness of the groundwater extraction and treatment system in maintaining an inward hydraulic gradient and removing contaminants from the Site. Monitoring of the groundwater and surface water will continue until the performance of the remedy can be demonstrated by the attainment of groundwater cleanup standards. An institutional controls study and IC plan will be completed within six months after the date of this Five-Year Review Report.

# Five-Year Review Summary Form

## Site IDENTIFICATION

**Site name *(from WasteLAN)*:** G&H Landfill

**EPA ID *(from WasteLAN)*:** MID980410823

**Region:** 05 | **State:** MI | **City/County:** Macomb County

## Site STATUS

**NPL status:** ☒ Final ☐ Deleted ☐ Other (specify) _____

**Remediation status** (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete

**Multiple OUs?*** ☐ YES ☒ NO | **Construction completion date:** 08 / 26 / 1999

**Has Site been put into reuse?** ☐ YES ☒ NO

## REVIEW STATUS

**Lead agency:** ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____

**Author name:** William J. Ryan

**Author title:** Remedial Project Manager | **Author affiliation:** U.S. EPA, Region 5

**Review period:**** 10 / 30 / 2005 to 09 / 30 / 2006

**Date(s) of Site inspection:** 02/14/06, and 04/24/06

**Type of review:**

☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion

**Review number:** ☐ 1 (first) ☒ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

**Triggering action:**

☐ Actual RA OnSite Construction at OU #____ ☐ Actual RA Start at OU#____
☐ Construction Completion ☒ Previous Five-Year Review Report
☐ Other (specify) _____

**Triggering action date *(from WasteLAN)*:** 09 / 05 / 2001

**Due date *(five years after triggering action date)*:** 09 / 05 / 2006

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

## Five-Year Review Summary, continued

### Issues:

- Hydraulic containment along the south wall of Phase II
- Hydraulic containment in the SW corner on Phase II
- Groundwater mounding at GW7
- Effectiveness of the leachate collection system at the toe of Phase III
- Adequacy of the current site survey
- Monitoring and Reporting
- Ensuring well integrity
- Institutional Controls

### Recommendations and Follow-up Actions:

- Investigate the apparent hydraulic connection between GH78 and GH79 and ensure the maintenance of an inward hydraulic gradient
- Evaluate the effects of the discontinuity in the slurry wall in the southwest corner. Plan to extend the slurry wall once the water main is abandoned and/or evaluate the potential of additional extraction wells to contain the landfill contents
- Determine the cause of the mounding at GW7
- Develop a plan to evaluate the effectiveness of the leachate collection system at the toe of Phase III
- Re-survey the site
- Reevaluate the list of analytical parameters and develop a system for regular electronic data submission
- Amend the O&M Plan to include a quality assurance process for determining when a well needs rehabilitation and/or replacement
- Complete an IC study for the Site within six months after the date of this Five-Year Review Report

### Protectiveness Statement:

The remedy is currently protective of human health and the environment in the short term. The landfill cover, groundwater extraction and treatment system, and access controls are functioning as designed, and have achieved the remedial objectives, which include minimizing the migration of contaminants to groundwater and surface water and preventing direct contact with contaminants at the Site.

Long-term protectiveness of the remedy is dependent upon the continued effectiveness of the groundwater extraction and treatment system in maintaining an inward hydraulic gradient and removing contaminants from the Site. Monitoring of the groundwater and surface water will continue until the performance of the remedy can be demonstrated by the attainment of groundwater cleanup standards. Long term protectiveness is dependent upon the implementation

of the institutional controls required by the ROD and listed in the Consent Decree, and will be subject to an institutional controls study to ensure they are adequately implemented, maintained, and monitored.

**Other Comments:**

None

# Five-Year Review Report

## I. Introduction

The purpose of this five-year review is to determine whether the remedy at the G&H Landfill Site (the Site) is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this five-year review pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the Site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such Site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The agency interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The United States Environmental Protection Agency (EPA) Region 5 conducted this five-year review of the remedial actions implemented at the G&H Landfill Site in Macomb County, Michigan. This review was conducted from May 2005 through July 2006. This report documents the results of the review. EPA was assisted in the review of the G&H Landfill Site by the Michigan Department of Environmental Quality.

This statutory review is the second five-year review for the G&H Landfill Site. The triggering action for this review is the date of the first five year review, as shown in EPA's WasteLAN database: 09/05/01. This five-year review is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. This document will become part of the G&H Landfill Site file and it will be placed into the Site information repository located at the Shelby Township Library, 51680 Van Dyke Avenue / Shelby Township, MI 48316 / (586) 739-7414.

## II. Site Chronology

| Event | Date |
|---|---|
| Initial discovery of problem or contamination | Early 1960s |
| Pre-NPL responses | • Michigan Water Resource Commission (MWRC) conducts a groundwater and surface water investigation in July 1965<br>• The State investigates the site several more times between 1973 and 1979 |
| NPL listing | September 8, 1983 |
| Removal actions | The U.S. EPA conducted four removal actions at the G&H landfill:<br><br>• July 1982: a fence is constructed around the oil seep area, and dams are built to direct surface water flow around the seeps<br>• July 1983: the fence is extended around the perimeter of the oil seeps, an oil skimmer is installed to prevent the migration of floating oil, and clay barriers are placed in the path of the oil seeps<br>• May 1986: recreational area trails are blocked with earthen berms, a gate is installed to restrict public access, a collector trench is excavated to connect isolated oil seeps, and sheetpile is installed to prevent oil from migrating beyond the collector trench<br>• July 1987: a chain-link fence is installed around the perimeter of the entire site |
| Remedial Investigation/Feasibility Study complete | December 21, 1990 |
| ROD signature | December 21, 1990 |
| ESD | March 13, 1992 |

| Event | Date |
|---|---|
| Enforcement documents (CD, AOC, Unilateral Administrative Order) | CD for Access/Cost Recovery, April 3, 1992<br>CD for Cost Recovery, September 2, 1992<br>CD for RD/RA, June 30, 1992 |
| Remedial design start | September 10, 1992 |
| Remedial design complete | June 2, 1995 |
| Actual remedial action start | August 19, 1996 |
| Construction completion date | August 24, 1999 |
| 1st five-year review | September 5, 2001 |

## III. Background

**Physical Characteristics** The 90-acre site is divided into three phases (See Attachment 2). An abandoned Conrail railroad right-of-way bisects the site, running from the southeast corner of the site to the northwest corner, separating the Phase I landfill area to the north from the Phase II landfill area to the south. The main site access road, with a gate located on 23-Mile Road, runs north-south on the site and separates the Phase III landfill area on the west from Phases I and II on the east. A portion of the former Clinton-Kalamazoo Canal, an abandoned navigational project, runs east-west through the northern portion of the site.

Current site topography is defined by three capped mounds that comprise the three phases of the former landfilling operation. While the site access road and railroad right-of-way are located at grade, each of the capped landfill mounds rise approximately 10-15 feet above the grade.

Structures on the site include a pumping/treatment facility located in the southwest corner of the Phase II landfill area, which treats effluent from the landfill and releases treated water into an adjacent wetland area. Operations at the treatment facility are currently managed by the PRP's technical consultants, Conestoga Rovers & Associates (CRA). CRA was also the engineering firm that implemented the G&H Landfill site remedy. The site includes a system of approximately 80 above-ground vents and monitoring wells distributed across the site.

A 200-acre preserve located immediately south of the G&H Landfill site, now known as Holland Ponds, was deeded to Shelby Township by the Michigan Department of Natural Resources in 1993. The area includes seven ponds whose source water includes the treated water that leaves the pumping/treatment station at the G&H Landfill site. Two of the seven ponds at the preserve were constructed by CRA to replace wetlands that had previously existed on the site. The Holland Ponds area provides habitat for migrating birds, box turtles, and painted turtles. A heron rookery is located adjacent to the site.

The Detroit Water & Sewer Department (DWSD) easement that runs through the western portion of the site contains a 96-inch water supply pipeline and a 24-inch interceptor sewer. The water supply line was constructed in 1967 and serves as the main distribution line from Lake Huron to the Detroit Municipal Water System. The 24-inch interceptor sewer, which serves Shelby Township, is connected to a 96-inch regional interceptor sewer which runs beneath portions of the Phase II and Phase III landfill areas.

**Land and Resource Use** The 90-acre G&H Landfill site is located at the junction of 23 Mile Road and Ryan Road (Attachment 1). It is surrounded by a mix of uses, including Spring Lake and Clear Spring Lake, two high-end residential developments to the north, an older residential subdivision of approximately 80 homes to the east, and several light industrial facilities located to the southeast. The Clinton River runs near the western and southern site boundaries, and the Holland Ponds Natural Area, part of the former Rochester-Utica State Recreational Area, is located south of the site. A temporary indoor soccer structure is located west of the site.

A study is currently underway to determine whether portions of the site can be returned to productive use by the surrounding community. EPA's primary responsibility at the site is to ensure the continued protection of human health and the environment. However, with effective planning communities can return sites to productive use without jeopardizing the effectiveness of the remedy. The local community and local government agencies have ongoing interests in the G&H Landfill Superfund site and have indicated strong interest in exploring reuse opportunities for the site.

EPA has engaged a consultant team to provide specialized reuse planning skills. In the spring of 2006, the team met with officials from Shelby Township, EPA Region 5, the Michigan Department of Environmental Quality (MDEQ), and PRP representatives. The team is conducting community research, mapping, and analysis to inform the reuse planning process. The outcome will support a community-based evaluation of the site and surroundings to identify site reuse challenges and opportunities, develop a conceptual site reuse framework and project report, and identify potential resources and partnerships to plan the site's future use.

**History of Contamination** The G&H site was a sand and gravel quarry until the early 1950s. After quarry operations ceased, the landowner leased the property to the G&H Industrial Fill Company. Waste disposal operations at the site began in the mid-1950s and ended in 1973. The site accepted municipal refuse and liquid and solid industrial wastes including oils, solvents, paint residues, and industrial process muds. The site contains three distinct landfill areas (Attachment 3):

- Phase I Landfill - 44 acres
- Phase II Landfill - 17 acres
- Phase III Landfill - 8 acres

Separate areas in the Phase I Landfill were identified as receiving solid and liquid wastes, in bulk and in drums. These areas, which are now covered with fill, include:

- Oil Pond No. 1
- Oil Pond No. 2
- Rubbish Area (referred to as the Co-disposal Area)
- Paint, Varnish, and Solvent Ponds

From approximately 1955 to 1967, the G&H Industrial Fill Company operated a waste oil disposal system at the site. Bulk waste oil from various industrial sources was transported to the site in railroad tanker cars or tanker trucks. Records indicate that an estimated 600,000 gallons of waste oil was accepted monthly at the site, although the time period over which this volume was accepted is not known. Initially, the operators attempted to reclaim oil by pumping mixtures to settling ponds and skimming off the recoverable oil for resale. Several attempts were made to reclaim the oil, but none were commercially successful. Thereafter, the oil was reportedly left to settle and the volatile components allowed to evaporate. The resulting sludge was periodically removed from the settling ponds and buried in the landfill.

**Initial Response** In the early 1960s, local residents lodged complaints with the Macomb County Health Board (MCHB) regarding chemical odors coming from the Clinton-Kalamazoo canal south of the landfill. An initial inspection by the MCHB did not locate the source of the odors, however a joint site surveillance by the MCHB and the Michigan Water Resource Commission (MWRC) discovered that groundwater seeps south of the railroad tracks emitted a strong chemical odor. MWRC noted that the landfill operation accepted waste oils and municipal trash, along with solvents, paints, etc., which were delivered in 55-gallon drums, and identified three areas in the Phase I landfill into which the contents of the drums were dumped. As a result, the MWRC conducted a groundwater and surface water investigation in July 1965.

The MWRC investigation determined that groundwater in the upper aquifer flowed generally to the south and that liquid waste operations were responsible for contamination in the groundwater south of the railroad tracks. As a result of this investigation, a Consent Order was issued by the Macomb County Circuit Court in May 1966 prohibiting the disposal of paints, varnishes, paint thinners, and lacquers in the G&H landfill. Waste oils were not addressed by this Consent Order.

A second MWRC investigation in November 1966 concluded that the waste oil disposal/reclamation activities at the landfill were also contributing to groundwater contamination. Based upon these findings, the Macomb County Circuit Court issued a second Consent Order in 1967 banning the disposal of any liquid industrial wastes at the landfill.

The State investigated the site several more times between 1973 and 1979. These sampling events documented potential contamination of the Clinton River by leachate seeps west of the Phase III landfill area and by oil seeps south of the Phase I landfill area.

**Basis for Taking Action** Prior to the remedial action an assessment of the sites risks concluded that onsite chemical exposure could occur by direct contact with contaminated media, or by release of volatile compounds and inhalation. Potential exposure pathways included transport offsite, release of contaminants to the groundwater and exposure through the use of groundwater as a water supply source, release of volatile compounds from the site and, exposure to people engaged in recreational activities in areas adjacent to the site through direct contact with contaminated surface water and sediments, and exposure of people that consume contaminated wildlife. Risks to the environment included exposure of terrestrial wildlife through direct contact with contaminated media at the site, and exposure of aquatic organisms in the Clinton River or Clinton-Kalamazoo Canal to contaminants released from the site to those water bodies by way of groundwater discharge or site runoff.

The exposures of greatest concern based on the quantitative risk characterization included:

- Direct contact with surface soil on the Phase I Landfill
- Direct contact with sediments in the Oil Seep Area
- Direct exposure to the oil seep water
- Use of groundwater as a drinking water source

**Soil Contamination** The areas of the highest chemical contamination in the soil were in the Phase I Landfill, primarily near the oil ponds and the suspected Co-disposal Area. Soils in or near the Phase II and III Landfills also showed contamination but to a lesser extent. Soils in the industrial area to the east showed that contamination extends offsite. Many organic contaminants were detected in the soil. BTEX compounds showed the greatest areal extent of contamination. Polynuclear aromatic hydrocarbons (PAHs) and PCBs were the other organic compounds most often detected and at the highest concentrations. Many inorganic compounds were detected above background concentrations in or near the three landfill areas.

**Groundwater Contamination** The vertical extent of groundwater contamination for BTEX, PNA, and chlorinated VOCs appeared to be limited to the base of the refuse and top of the upper sand unit. The horizontal extent of BTEX and chlorinated VOC contamination extended from the north boundary of the site southward to the south side of the Clinton Kalamazoo Canal. The highest concentrations of chlorinated VOCs were adjacent to the old solvent pond. Chlorinated VOCs were detected around the sheet pile wall in the Oil Seep Area and near the Oil Storage Building. The chlorinated VOCs extended to the south side of the Clinton Kalamazoo Canal. PNA contamination in the groundwater appeared to follow the same trends as BTEX contamination but to a lesser extent and at lower levels. A till layer isolates the upper aquifer from the lower aquifer. No contamination was detected in the lower aquifer.

**Well Sampling** BTEX and chlorinated VOCs were detected in residential and commercial well water in the vicinity of the site. These waste types were consistent with wastes detected onsite. Contamination in the industrial area appeared to be site related because the waste types were consistent with wastes detected onsite and the contamination was detected upgradient in the auto disposal yard. Because the types of contaminants found east of Ryan Road were consistent with those found onsite, it was thought that the contamination east of Ryan Road may be site related. However, no contamination was detected upgradient of this area.

**Surface Water and Sediment Contamination** Separate phase liquids and contaminated groundwater from the original Phase I Landfill area were the sources of the sediment and surface water contamination in the Oil Seep Area and the contamination of surface runoff which in turn contaminated the groundwater south and southwest of the Oil Seep Area. BTEX and PNA compounds were detected in surface water upgradient of the Oil Seep Area.

## IV. Remedial Actions

**Remedy Selection** EPA issued a Record of Decision ("ROD") on December 21, 1990 that called for a remedy comprising the following elements:

- Installation of a modified RCRA Subtitle C landfill cover to prevent direct contact and reduce the rate of infiltration to the water table
- Excavation of impacted soils from areas outside of the landfill cover placement of the impacted soils beneath the landfill cover
- Installation of a slurry wall around the landfill areas to physically contain the landfill contents

and a toe drain on the west side of the landfill to capture leachate for treatment

- Installation of a groundwater extraction and treatment system to capture and hydraulically contain the landfill contaminants
- Implementation of a monitoring program to ensure the adequacy of the groundwater cleanup
- Mitigation of impacted wetlands and creation of new wetlands to replace those lost to contamination or remedial construction
- Establishment of cleanup standards for groundwater outside of the landfill based on Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and State of Michigan criteria for protection of groundwater quality

Final cleanup goals for the Site are as follows:

**Groundwater Cleanup Standards from ROD**

| *Contaminant* | *Cleanup Standard* |
|---|---|
| Benzene | 1 ppb |
| Xylene | 20 ppb |
| Ethylbenzene | 30 ppb |
| Arsenic | 0.02 ppb* |
| Lead | 5 ppb |
| Trichloroethene | 3 ppb |
| Tetracloroethene | 0.7 ppb |
| cis-1,2-Dichloroethene | 1 ppb |
| trans-1,2-Dichloroethene | 100 ppb |
| Vinyl chloride | 0.02 ppb |
| 1,1-Dichloroethane | 0.4 ppb |

*** Naturally occurring (background) levels found at the G&H site may be higher than the Cleanup Standard. In that event, background levels will become the Cleanup Standard.**

EPA issued an Explanation of Significant Differences (ESD) on March 13, 1992. In the ESD, the Agency determined that:

- The Frost Protection Layer of the Landfill Cap could be reduced from the 42 inches to 30 inches

- The slurry wall did not need to completely encircle the landfill, as placing a slurry wall along the upgradient edge of the landfill may cause groundwater to back up behind the slurry wall and perhaps enter basements in the homes north of the landfill.

- EPA, in consultation with MDNR, also changed the groundwater cleanup standards for three chemical contaminants, shown in the table below:

**Groundwater Cleanup Standards Modified by the ESD**

| Chemical | ROD Cleanup Standard | ESD Cleanup Standard |
|---|---|---|
| Tetrachloroethene | 0.7 ppb | 1.0 ppb |
| Vinyl chloride | 0.02 ppb | 1.0 ppb |
| 1, 1-Dichloroethane | 0.4 ppb | 1.0 ppb |

**Remedy Implementation** In a Consent Decree (CD) signed with EPA on June 30, 1992, the PRPs agreed to perform the remedial design/remedial action (RD/RA). The Remedial Design (RD) was conducted in conformance with the ROD as modified by the ESD. The RD started on September 10, 1992, and was completed on June 2, 1995. The RA started on August 19, 1996, and was completed on August 24, 1999.

The RD had two parts: 1) the groundwater and leachate treatment system, and 2) the landfill cap and slurry wall. EPA, in consultation with MDEQ, approved one major design change involving the substitution of a combination of 1 foot of clay and a bentonite-containing geotextile liner for the required 3 feet of clay in a Subtitle C landfill cap. The PRPs were able to demonstrate equivalent performance of the clay/geotextile liner versus the thicker clay layer to support the design change.

The major components the RA included:

- Installation of a modified RCRA Subtitle C landfill cover to prevent direct contact and reduce the rate of infiltration to the water table;
- Excavation of impacted soils from areas outside of the landfill cover placement of the impacted soils beneath the landfill cover;
- Installation of a slurry wall around the landfill areas to physically contain the landfill contents and a toe drain on the west side of the landfill to capture leachate for treatment;
- Installation of a groundwater extraction and treatment system to capture and hydraulically contain the landfill contaminants;
- Implementation of a monitoring program to ensure the adequacy of the groundwater cleanup;
- Mitigation of impacted wetlands and creation of new wetlands to replace those lost to contamination or the cleanup

**System Operation and Maintenance** The PRPs are conducting long-term monitoring and maintenance activities according to the EPA approved operation and maintenance (O&M) plan. The primary activities associated with O&M include:

- Bi-weekly and monthly inspections are conducted in the landfill cap, groundwater/leachate collection systems, slurry wall, wetlands areas, access roads, and perimeter security fence. In addition, the cap is scheduled to be mowed semi-annually;
- Groundwater samples and water level measurements are obtained quarterly from 71 monitoring wells

**Annual System Operations/O&M Costs**

| Dates | | Total Cost rounded to nearest $1,000 |
|---|---|---|
| From | To | |
| 9/2005 | 9/2006 | $451,000 |
| 9/2004 | 9/2005 | $492,000 |
| 9/2003 | 9/2004 | $506,000 |
| 9/2002 | 9/2003 | $588,000 |
| 9/2001 | 9/2002 | $716,000 |

**Institutional Controls** ICs are non-engineered instruments, such as administrative and legal controls, that help to minimize the potential exposure to contamination and protect the integrity of the remedy. ICs are required to ensure long-term protectiveness for any areas that do not allow unlimited use or unrestricted exposure (UU/UE).

The ROD stipulates that ICs will be relied upon to provide additional effectiveness to the remedy. Deed restrictions shall be placed on the landfill area property to regulate the development of the landfill. An aerial photograph of the Site, showing the area to be subject to the deed restrictions, can be found in Attachment 7. Groundwater-use restrictions shall be maintained in the off-site areas to the east of Ryan Road until Groundwater Cleanup Standards are met.

The Consent Decree requires the PRPs to record a fully executed copy of the Consent Decree and the Deed Restrictions (Attachment 8) with the Register of Deeds Office, Macomb County, State of Michigan, to ensure that future use of the Site will not impair or defeat any response actions on, under, or adjacent to the Site.

Consistent with the ROD, the Consent Decree requires that the following restrictions be imposed upon the Site for the purposes of protecting public health and the environment, and preventing interference with the remedy:

- No consumptive or other use of the groundwater that could cause exposure of humans or animals to the groundwater underlying the Site

- No residential, commercial, or agricultural use of the Forster property considered part of the Site, including, but not limited to, any filling, grading, excavating, building, drilling, mining, farming, or other development, or placing of waste material at any portion of the Site, including, but not limited to, the Auto Disposal Yard for any purpose, including residential, commercial, or agricultural purposes, except as approved in writing, by U.S. EPA

- No use of the Site that would allow the continued presence of humans at the Site, other than the presence necessary for implementation of any response actions selected and/or undertaken by U.S. EPA pursuant to Section 104 of CERCLA, including such response actions taken by other responsible parties under a judicial or administrative order. A prohibited use of the Site includes, but is not limited to, recreational use

- No installation, removal, construction or use of any buildings, wells, pipes, roads, ditches or any other structures or materials at the Site except as approved, in writing, by U.S. EPA, and in consultation with the State of Michigan

- No tampering with, or removal of, the containment or monitoring systems that remain on the Site as a result of implementation of any response action by U.S. EPA, or any party acting as agent for U.S. EPA, and which is selected and/or undertaken by U.S. EPA pursuant to Section 104 of CERCLA

- No use of, or activity at, the Site that may interfere with, damage, or otherwise impair the effectiveness of any response action (or any component thereof) selected and/or undertaken by U.S. EPA, or any party acting as agent for U.S. EPA, pursuant to Section 104 of CERCLA, except with the written approval of U.S. EPA, in consultation with the State of Michigan, and consistent with all statutory and regulatory requirements.

The obligation to implement and maintain the above restrictions shall run with the land and shall remain in effect until such time as U.S. EPA files with the Court a written certification stating:

- The response action required at, under or adjacent to the Site by any Consent Decree or judicial or administrative order, entered pursuant to CERCLA, has been fully implemented;

- No other response actions are planned for the Site; and

- The above restrictions are no longer necessary to meet the purposes of the remedy.

An institutional controls study will be completed for the Site within six months after the date of this Five-Year Review Report. Among other things, the institutional controls study should investigate whether the deed restrictions were actually put in place for the Site and were conveyed by a person with authority to make the conveyance; whether the deed restrictions are currently valid, in place, and have not been lifted or superceded; whether the terms of the deed restrictions create rights that can be enforced by U.S. EPA or MDEQ in the event that the deed restrictions are violated; and whether the deed restrictions are, in fact still being complied with.

U.S. EPA will create an IC Plan that includes steps necessary to ensure effective ICs are implemented and maintained. As part of the plan, U.S. EPA will request that the PRPs undertake an IC Study to ensure that effective ICs have been implemented. Also, EPA will request assurances for long-term stewardship including regular inspections of the Site and an annual certification to EPA that ICs are effective and that IC maps are completed. The IC maps will be

made available to the public on EPA's Superfund Data Management System (SDMS).

## V. Progress Since the Last Review

**Protectiveness statements from the last review:** "Should the Group (PRPs) continue to operate and maintain the final remedial action components pursuant to the ROD and ESD, as designed, and make the recommended improvements listed above, the remedy selected for the G&H site is protective of human health and the environment."

**Issues and status of recommendations for follow-up actions from last review:**

1. Leachate is discharging into the wetland area known as Wetland/Pond 3, creating periodic low-level chronic toxicity problems.

- **Recommendation**: Install a new pumping well to mitigate the discharge to Wetland/Pond 3.

- **Status**: A new collection well (EW6) was installed upgradient of mitigated Wetland/Pond 3 in June 2002. EW6 has effectively eliminated the observed seep into Wetland/Pond 3.

2. The landfill cap drainage layer along the Phase III landfill area is leaking water during high rain events.

- **Recommendation**: Sample the water for leachate and investigate further if leachate is found in the water samples.

- **Status**: These discharges or outbreaks were sampled on May 9, 2000, by CRA and the MDEQ. The sampling of the iron stained discharges from the toe of Phase III detected inorganic and organic contamination. The detection of VOCs indicates that the discharges were more than simply iron bacteria precipitating out of the cap tiles as precipitation infiltrated the cap. A groundwater investigation was performed, and eleven wells, designated GW, were installed.

3. Groundwater capture along the west side of the water main (where the slurry wall was not installed) may not be entirely successful at this time.

- **Recommendation**: Increase pumping rates to ensure hydraulic containment.

- **Status**: Extraction wells (EW1 - EW5) were installed along the west side of the DWSD water main to de-water it. However, the performance of this system has been affected by the ongoing operational interruptions from iron precipitation in Sump S-4. To reduce the operational interruptions in Sump S-4, a peristaltic pump was installed in Sump S-4. This pump should result in less interruption to the system's operation and its performance is being evaluated.

4. Monitoring wells MW 4A and MW 4B. are no longer functioning as designed.

- **Recommendation**: Abandon and replace MW 4A and MW 4B.

- **Status**: MW 4A and MW 4B have been replaced.

5. Several new monitoring wells have been installed at the site area (wells GW 1, GW2, GW3, GW10, and GW11).

- **Recommendation**: Include these MW in the site groundwater monitoring program.

- **Status**: Some of the monitoring wells have been added to the groundwater monitoring program.

## VI. Five-Year Review Process

**Administrative Components** For the current report the Remedial Project Manager (RPM) established a review schedule, which included:

- Community Notification
- Document Review
- Data Review
- Site Inspections
- Five-Year Review Report Development and Review

A letter notifying the State that U.S. EPA would be conducting a FYR (Five-Year Review) in 2006 was sent to the State Project Manager in December 2005. Members of the review team included:

- Bill Ryan, U.S. EPA, Remedial Project Manager
- Lisa Summerfield, MDEQ, State Project Manager (Note: Ms Summerfield was replaced by Mary Schaffer in May, 2006)
- Barb Vetort-Tiffany, MDEQ, State Project Geologist

**Community Notification** Activities to involve the community in the five-year review process were initiated in April 2006 with a call to the Community Involvement Coordinator (CIC) for the G&H site. A notice was published in a weekly Macomb County newspaper, *The Source*, on April 16, 2006. No one in the community has voiced any interest or opinion concerning the five-year review process since the notice was issued.

**Document Review** This five-year review included a review of the following documents:

Enforcement documents (Consent Decrees and Administrative Orders)
Design documents (RI/FS Reports)

Decision documents (ROD)
O&M records and monitoring data

**Data Review** EPA reviewed the electronic data submitted pursuant to Regional policy in the preparation of this FYR. These include monitoring results for 71 groundwater and 9 surface water monitoring points. The data reveal that while exceedances of cleanup goals remain at various monitoring points, the potential for exposure is controlled or below the threshold for unacceptable risk. Tables summarizing the monitoring and sampling data can be found in Attachment 4.

**Site Inspections** The RPM inspected the Site on 02/14/2006. He was accompanied by the Site Site Geologist from MDEQ, the Remediation Specialist from Daimler Chrysler (a PRP), and the PRP's Project Manager in charge of the Site. The group reviewed the Site history and examined the landfill cap, adjacent wetlands, and the groundwater extraction and treatment system, confirming that the installations were functioning as designed and that the cover and fencing were intact. Specific observations include:

- Fence - the main part of the fence, which isolates the landfill and treatment plant from public access, is intact and well maintained.
- Roads - the access roads into the site, around the perimeter of the capped area, to the treatment plant, and through the wetlands area were properly graded and well maintained.
- Landfill Cap - the cap appears intact and well maintained. No signs of settlement, cracks, erosion, holes, penetrating vegetation, bulges, or slope instability were observed.
- Wetlands - the wetlands associated with the treatment plant and Holland Ponds area appear to be thriving, however Wetland Area 1, in the NE corner of the Site, was substantively dry, because this wetland sits above the local water table and is dependent on precipitation.
- Treatment Plant - the treatment plant discharge reports were reviewed with the plant operator and no substantive deficiencies were noted.

**Interviews** Interviews with individuals beyond the five-year review project team and treatment plant operator were not conducted. Since the newspaper notice, no member of the community or any other individual voiced any interest in conducting an interview related to the five-year review.

## VII Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicate that the remedy is functioning as intended by the ROD, as modified by the ESD. The removal, stabilization, and capping of contaminated soils and sediments has achieved the remedial objectives to minimize the migration of contaminants and prevent direct contact with, or ingestion of, contaminants in soil and sediments.

Operation and maintenance of the cap and drainage structures has, on the whole, been effective. Maintenance on the cap is sufficient to maintain its integrity. O&M annual costs are consistent with original estimates and there are no indications of any substantive difficulties with the remedy. However, there are questions regarding whether the monitoring well network currently provides sufficient data to assess the overall effectiveness of the remedy, and whether hydraulic containment of leachate within the boundary of the capped areas needs further evaluation.

The institutional controls that are required by the Consent Decree include prohibitions on the groundwater use, prohibitions on excavation or disturbance of the cap, and any other activities that might interfere with the remedy. However, it remains necessary to verify that the institutional controls are in place and effective. No activities were observed that would have violated the institutional controls. The cap remains undisturbed, no new uses of groundwater were observed, and the fence around the site is in good repair.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (older child trespasser, adult trespasser) and potential future exposures (young and older future child resident, future adult resident and future adult worker). There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions, or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

MDEQ has raised the issue that the selected remedy may not conform to the standards of Michigan's generic Groundwater Surface Water Interface (GSI) criteria. EPA will continue to discuss the issue with the State.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

There is some concern that the slurry wall may be compromised along the southern edge of Phase II, and containment at the southwest end of the slurry wall near the DWSD water main is uncertain. These issues need further evaluation. Plans to extend the slurry wall once DWSD abandons the water main, or install additional extraction wells to ensure hydraulic containment of the landfill contents, should be developed.

**Technical Assessment Summary**

According to the data reviewed and the site inspection, the remedy is functioning as intended by the ROD, as modified by the ESD. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment,

and there have been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. However, hydraulic containment of leachate within the boundary of the capped areas needs further evaluation to determine if further engineering controls will be necessary.

## VIII. Issues

| Issues | Affects Current Protectiveness (Y/N) | Affects Future Protectiveness (Y/N) |
|---|---|---|
| • There is evidence that the hydraulic containment along the south wall of Phase II may be compromised. | N | Y |
| • Hydraulic containment in the SW corner on Phase II is affected by a discontinuity in the slurry wall due to the presence of the DWSD waterline. | N | Y |
| • Groundwater mounding at GW7 remains unexplained. A 7 ft hydraulic head difference was recorded between the water level in GW7 and the surrounding source area. | N | Y |
| • Effectiveness of the leachate collection system at the toe of Phase III has been questioned, and there have been problems in maintaining adequate flow to the treatment plant. | N | Y |
| • MDEQ has questioned the adequacy of the monitoring network and list of analytical parameters for ensuring the continued protectiveness of the Site. | N | Y |
| • Institutional Controls and deed restrictions are outlined in the CD, however their implementation is uncertain and needs review. | N | Y |
| • Long-term stewardship of the Site must be ensured. | N | Y |

## IX. Recommendations and Follow-up Actions

| Issue | Recommendations and Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness (Y/N) | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| South wall of Phase II | Investigate the apparent hydraulic connection between GH78 and GH79 and ensure that an inward hydraulic gradient is maintained. | PRP | State/EPA | 9/30/07 | N | Y |
| SW corner of Phase II | Evaluate the effects of the discontinuity in the slurry wall in the southwest corner. Plan to extend the slurry wall once the water main is abandoned and/or evaluate the potential of additional extraction wells to contain the landfill contents. | PRP | State/EPA | 9/30/07 | N | Y |
| Mounding at GW7 | Determine the cause of the mounding at GW7. | PRP | State/EPA | 6/30/07 | N | Y |
| Toe of Phase III | Develop a plan to evaluate the effectiveness and maintain flow in the leachate collection system at the toe of Phase III. | PRP | State/EPA | 6/30/07 | N | Y |

| Issue | Recommendations and Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness (Y/N) | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| Monitoring and Reporting | Reevaluate the monitoring well network and the list of analytical parameters. Develop a system for regular electronic data submission. | PRP | State/EPA | 3/30/07 | N | Y |
| Institutional controls | An IC plan will be completed within six months of the date of this Five-Year Review Report. | PRP | State/EPA | 3/30/07 | N | Y |
| Long-term stewardship | Develop an IC Action Plan[1] | EPA | EPA | 3/30/07 | N | Y |

The FYR has brought to light two additional issues that do not affect the protectiveness of the Site, but that require attention, nonetheless.

- Changes in the monitoring well network call into question the adequacy of the current site survey. EPA recommends that the PRPs re-survey the site.

- The Site currently lacks protocols for ensuring monitoring and extraction well integrity. EPA recommends that the PRPs amend the O&M Plan to include a quality assurance process for determining when a well needs rehabilitation and/or replacement.

[1] The IC Plan will include provisions for: a) completing an IC study to evaluate whether effective ICs have been implemented; b) implementing corrective measures; c) developing IC maps; and ensuring that effective procedures are in place for long-term stewardship. These procedures should include regular inspections of ICs at the Site and certifications to EPA that ICs are in-place and effective, along with exploring the development of a communications plan and exploring the use of the state's one-call system.

## X. Protectiveness Statements

**Short-term Protectiveness** The remedy is currently protective of human health and the environment in the short term. The landfill cover, groundwater extraction and treatment system, and access controls are functioning as designed, and have achieved the remedial objectives, which include minimizing the migration of contaminants to groundwater and surface water and preventing direct contact with contaminants at the Site.

**Long-term Protectiveness** Long-term protectiveness of the remedy is dependent upon the continued effectiveness of the groundwater extraction and treatment system in maintaining an[2] inward hydraulic gradient and removing contaminants from the Site. Monitoring of the groundwater and surface water will continue until the performance of the remedy can be demonstrated by the attainment of groundwater cleanup standards. Long term protectiveness is dependent upon the implementation of the institutional controls listed in the Consent Decree, and will be subject to an institutional controls study and IC Plan to ensure they are adequately implemented, maintained, and monitored.

## XI. Next Review

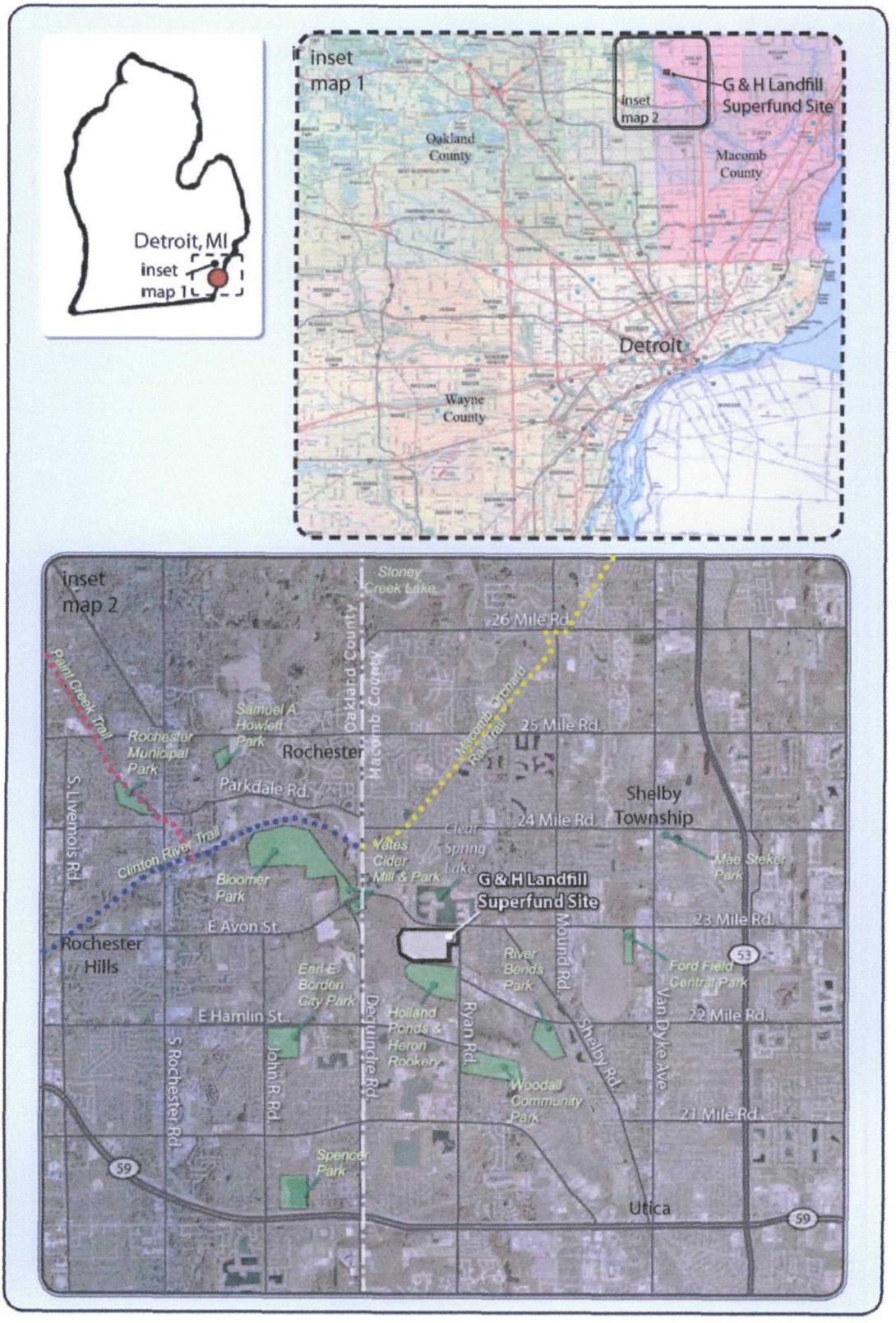
The next five-year review for the G&H Landfill Site will be conducted in 2011, and that report will be due five years from the signature of this report.

## Attachments

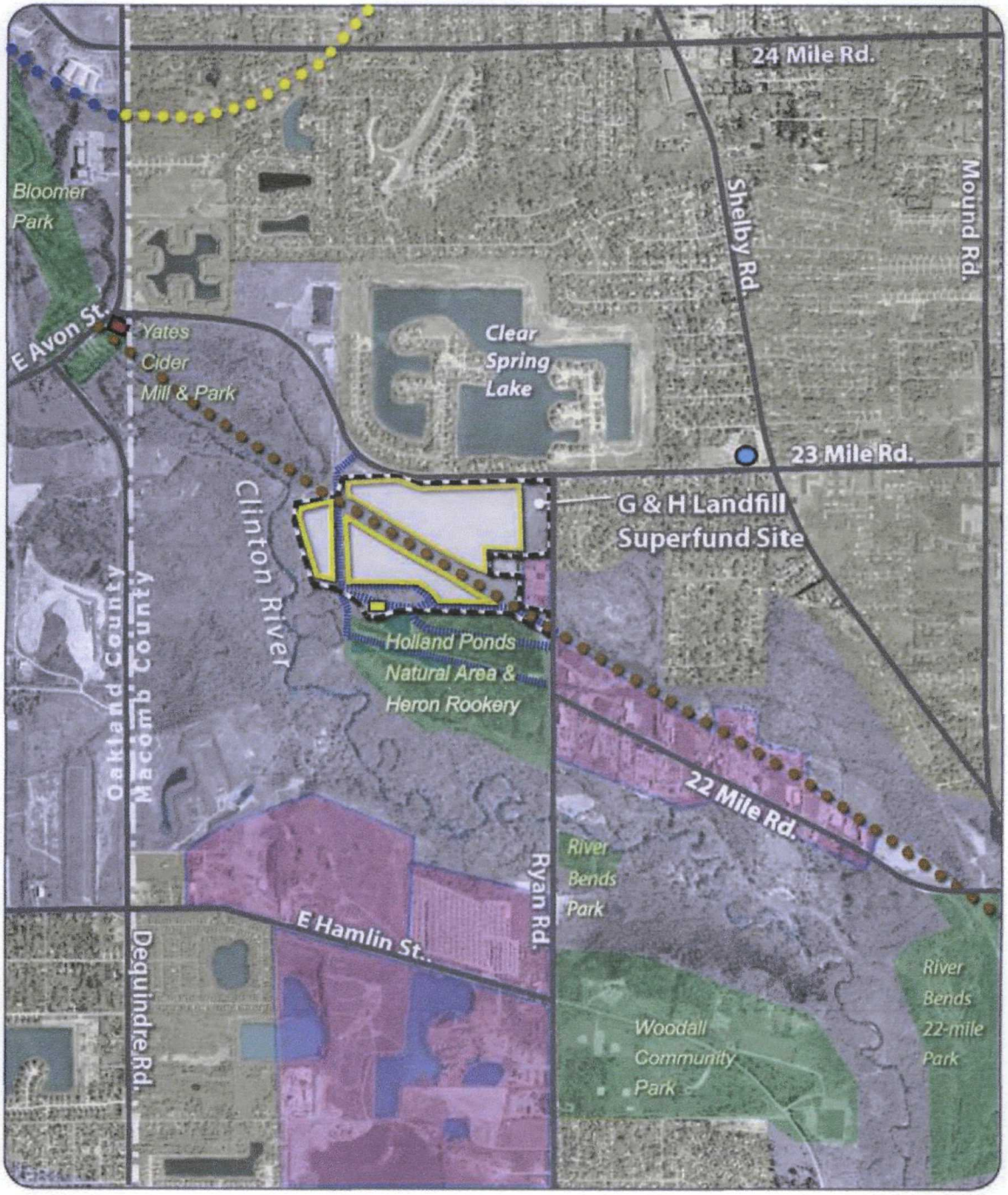
1. Site Index Map
2. Site and Surroundings
3. Site Areas
4. Summary of Groundwater Sampling Results
5. Federal Applicable or Relevant and Appropriate Requirements (ARARs)
6. State Applicable or Relevant and Appropriate Requirements (ARARs)
7. IC Map
8. Deed Restrictions

# ATTACHMENTS

# Attachment 1 Site Map

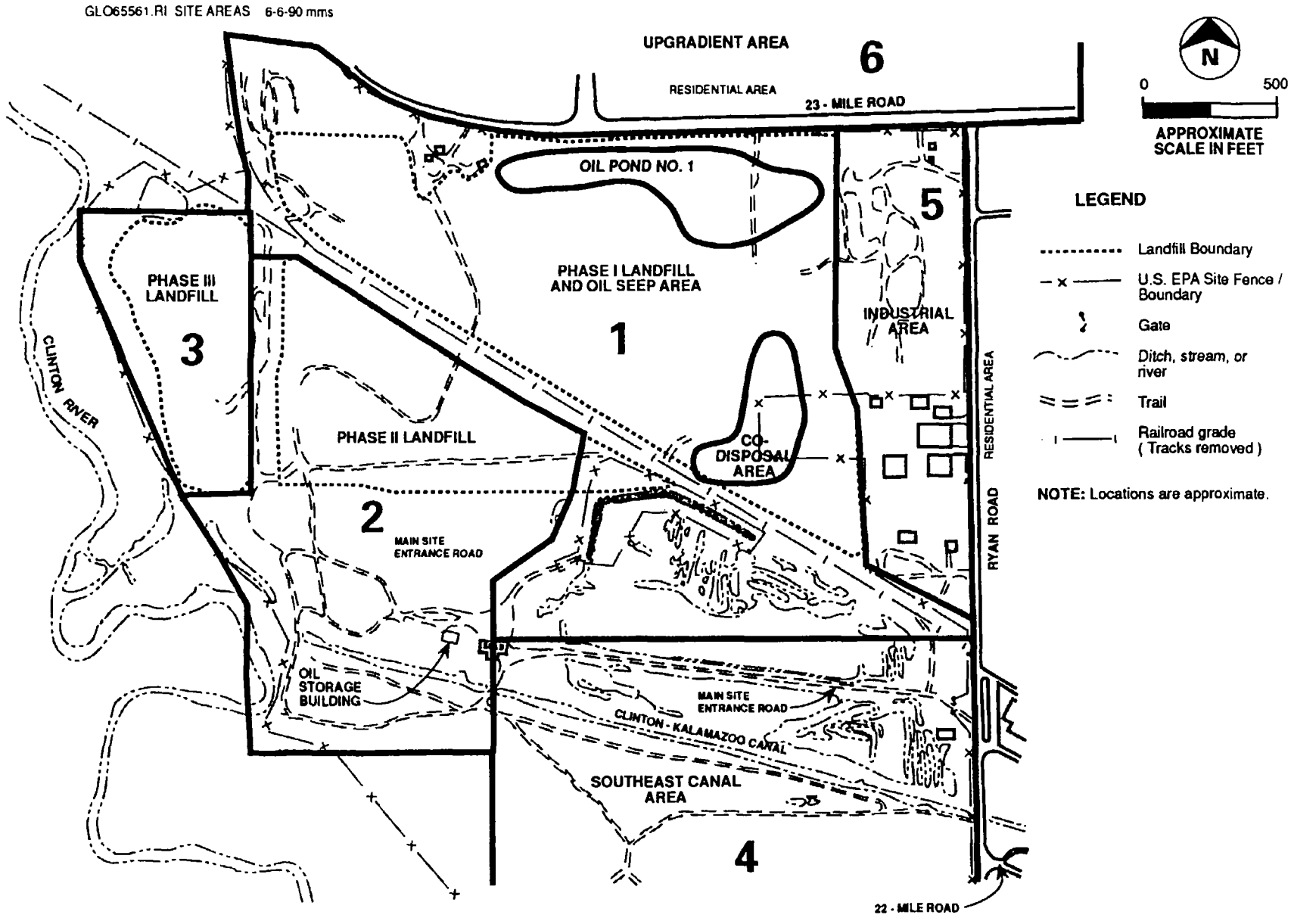


Attachment 2 Map of G & H Landfill
Superfund Site and Surroundings




Key

- G&H Landfill Boundary Line
- G&H Landfill Containment Cells (phases I-III)
- G&H Landfill Water Treatment Facility
- Rail Line (not in use)
- Gravel Road
- Clinton River Trail
- Macomb Orchard Trail
- Residential Areas
- Industrial Land Uses
- Parks and Recreation
- Elementary School




Attachment 3. Site Areas

| Analyte Name | Well ID | Units* | Trend Test (60.0% Confidence) Result | Trend Test (60.0% Confidence) Slope Estimate (Units*/Yr) | Compare-to-Standard Test (80.0% Confidence) Result | Compare-to-Standard Test (80.0% Confidence) UCL (Units*) | Compare-to-Standard Test (80.0% Confidence) Standard (Units*) | Compare-to-Baseline Test (80.0% Confidence) Result | Compare-to-Baseline Test (80.0% Confidence) UPL (Units*) |
|---|---|---|---|---|---|---|---|---|---|
| ARSENIC | SW-102 | ug/l | No Trend | 0# | Exceedance | 16.31 | 0.02 | Better | 13 |
| ARSENIC | SW-103 | ug/l | No Trend | 0# | Exceedance | 11.99 | 0.02 | Better | 10 |
| ARSENIC | SW-104 | ug/l | No Trend | 0# | Exceedance | 10.63 | 0.02 | No Change | 10 |
| ARSENIC | SW-105 | ug/l | No Trend | -0.109# | Exceedance | 11.81 | 0.02 | No Change | 11.32 |
| ARSENIC | SW-106 | ug/l | No Trend | 0# | Exceedance | 17.9 | 0.02 | No Change | 10.76 |
| ARSENIC | SW-107 | ug/l | No Trend | 0# | Exceedance | 32.71 | 0.02 | NR | |
| BENZENE | GH-29B | ug/l | No Trend | 0# | Exceedance | 8.167 | 1 | NR | |
| BENZENE | GH-33A | ug/l | NR | # | Exceedance | 1.072 | 1 | NR | |
| BENZENE | GH-50 | ug/l | No Trend | 0# | Exceedance | 3.235 | 1 | Better | 3.508 |
| BENZENE | GH-51 | ug/l | No Trend | 0# | Exceedance | 3.583 | 1 | No Change | 4.359 |
| BENZENE | GH-53 | ug/l | Downward | -0.1348# | Exceedance | 1.902 | 1 | No Change | 4.233 |
| BENZENE | GH-55 | ug/l | Downward | -0.2942# | Exceedance | 1.869 | 1 | Better | 9.153 |
| BENZENE | GH-57 | ug/l | No Trend | 0.05642# | Exceedance | 2.371 | 1 | No Change | 4.463 |
| BENZENE | GH-59 | ug/l | No Trend | 0# | Exceedance | 8.167 | 1 | No Change | 0.5 |
| BENZENE | GH-66 | ug/l | Downward | -0.1316# | Exceedance | 5.65 | 1 | Better | 10.41 |
| BENZENE | GH-67 | ug/l | Downward | -0.08295# | Exceedance | 6.129 | 1 | Better | 9.721 |
| BENZENE | GH-68 | ug/l | Downward | -0.2474# | Exceedance | 2.645 | 1 | Better | 9.786 |
| BENZENE | GH-69 | ug/l | No Trend | 0# | Exceedance | 4.997 | 1 | No Change | 6.007 |
| BENZENE | GH-78 | ug/l | No Trend | 0.8213# | Exceedance | 34.77 | 1 | NR | |
| BENZENE | GH-79 | ug/l | Downward | -0.4491# | Exceedance | 16.75 | 1 | Better | 208.9 |
| BENZENE | GH-81 | ug/l | No Trend | -0.06757# | Exceedance | 2.586 | 1 | Better | 8.798 |
| BENZENE | GW-1 | ug/l | No Trend | 0.1398# | Exceedance | 2.459 | 1 | No Change | 2 |
| BENZENE | GW-11 | ug/l | No Trend | 0# | Exceedance | 1.242 | 1 | No Change | 0.5 |
| CIS-1,2-DICHLOROETHYLENE | GH-43B | ug/l | No Trend | 0# | Exceedance | 9.136 | 1 | No Change | 0.5 |
| CIS-1,2-DICHLOROETHYLENE | GH-51 | ug/l | Downward | -0.283# | Exceedance | 1.539 | 1 | Better | 12.29 |
| LEAD | GH-1A | ug/l | No Trend | 0.0111# | Exceedance | 17.94 | 5 | No Change | 21.54 |
| LEAD | GH-1B | ug/l | No Trend | 0# | Exceedance | 29.31 | 5 | Worse | 16.33 |
| LEAD | GH-2A | ug/l | No Trend | 0# | Exceedance | 29.88 | 5 | Worse | 7.894 |
| LEAD | GH-2B | ug/l | Upward | 0.1829# | Exceedance | 14.81 | 5 | Worse | 12.94 |
| LEAD | GH-5A | ug/l | No Trend | 0.08558# | Exceedance | 31.94 | 5 | No Change | 123.9 |
| LEAD | GH-8A | ug/l | No Trend | 0.1182# | Exceedance | 25.8 | 5 | No Change | 67.34 |
| LEAD | SW-102 | ug/l | No Trend | 0.2165# | Exceedance | 8.333 | 5 | No Change | 6.088 |
| TETRACHLOROETHYLENE(PCE) | GW-8 | ug/l | No Trend | 0# | Exceedance | 1.192 | 1 | No Change | 0.5 |
| TRICHLOROETHYLENE (TCE) | GH-29B | ug/l | No Trend | 0# | Exceedance | 6.683 | 3 | NR | |
| TRICHLOROETHYLENE (TCE) | GW-8 | ug/l | No Trend | 0# | Exceedance | 3.814 | 3 | No Change | 0.5 |
| VINYL CHLORIDE | GH-19A | ug/l | No Trend | 0# | Exceedance | 1.223 | 1 | NR | |
| VINYL CHLORIDE | GH-43B | ug/l | Downward | -0.1066# | Exceedance | 19.47 | 1 | Better | 29.15 |

# means trend coefficient of log-transformed data. Log(2) times reciprocal is doubling(+)/halving(-) time.

Statistical Note: ND surrogate = 0.5 X Median of Nondetects' PQLs.

Results created on 09-May-2006 .

## Attachment 4. Summary of Groundwater Sampling Data

| Analyte Name | Well ID | Units* | Trend Test (60.0% Confidence) | | Compare-to-Standard Test (80.0% Confidence) | | | Compare-to-Baseline Test (80.0% Confidence) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Result | Slope Estimate (Units*/Yr) | Result | UCL (Units*) | Standard (Units*) | Result | UPL (Units*) |
| ARSENIC | BW-2A | ug/l | NR | # | Exceedance | 11.56 | 0.02 | NR | |
| ARSENIC | BW-2B | ug/l | NR | # | Exceedance | 4.498 | 0.02 | NR | |
| ARSENIC | GH-15A | ug/l | No Trend | -0.1744# | Exceedance | 8.786 | 0.02 | NR | |
| ARSENIC | GH-15B | ug/l | Downward | -0.2289# | Exceedance | 8.806 | 0.02 | NR | |
| ARSENIC | GH-16A | ug/l | No Trend | -0.1297# | Exceedance | 8.945 | 0.02 | NR | |
| ARSENIC | GH-1A | ug/l | No Trend | -0.03814# | Exceedance | 21.63 | 0.02 | No Change | 61.43 |
| ARSENIC | GH-1B | ug/l | No Trend | 0# | Exceedance | 9.961 | 0.02 | No Change | 10 |
| ARSENIC | GH-20B | ug/l | No Trend | -0.04721# | Exceedance | 9.471 | 0.02 | NR | |
| ARSENIC | GH-22A | ug/l | No Trend | 0# | Exceedance | 9.984 | 0.02 | No Change | 10 |
| ARSENIC | GH-25A | ug/l | No Trend | -0.1469# | Exceedance | 64.84 | 0.02 | NR | |
| ARSENIC | GH-26A | ug/l | Downward | -0.1885# | Exceedance | 8.81 | 0.02 | NR | |
| ARSENIC | GH-29A | ug/l | Downward | -0.2308# | Exceedance | 8.873 | 0.02 | NR | |
| ARSENIC | GH-29B | ug/l | No Trend | 0# | Exceedance | 9.951 | 0.02 | NR | |
| ARSENIC | GH-2A | ug/l | No Trend | 0# | Exceedance | 14 | 0.02 | No Change | 10 |
| ARSENIC | GH-2B | ug/l | Upward | 0.1689# | Exceedance | 42.51 | 0.02 | No Change | 37.98 |
| ARSENIC | GH-33A | ug/l | NR | # | Exceedance | 48.2 | 0.02 | NR | |
| ARSENIC | GH-33B | ug/l | Downward | -0.3211# | Exceedance | 30.13 | 0.02 | NR | |
| ARSENIC | GH-34A | ug/l | Downward | -0.07726# | Exceedance | 31.73 | 0.02 | No Change | 44.68 |
| ARSENIC | GH-34B | ug/l | No Trend | 0# | Exceedance | 10.14 | 0.02 | No Change | 20.7 |
| ARSENIC | GH-36A | ug/l | No Trend | 0# | Exceedance | 9.952 | 0.02 | NR | |
| ARSENIC | GH-36B | ug/l | No Trend | 0# | Exceedance | 10.99 | 0.02 | NR | |
| ARSENIC | GH-3A | ug/l | No Trend | -0.01223# | Exceedance | 61.07 | 0.02 | Worse | 51.15 |
| ARSENIC | GH-3B | ug/l | Downward | -0.1033# | Exceedance | 32.14 | 0.02 | No Change | 96.6 |
| ARSENIC | GH-43A | ug/l | No Trend | 0# | Exceedance | 8.396 | 0.02 | No Change | 10 |
| ARSENIC | GH-43B | ug/l | No Trend | 0# | Exceedance | 18.9 | 0.02 | No Change | 10 |
| ARSENIC | GH-44A | ug/l | No Trend | -0.0795# | Exceedance | 51.33 | 0.02 | No Change | 112.8 |
| ARSENIC | GH-45A | ug/l | No Trend | 0# | Exceedance | 13.76 | 0.02 | No Change | 10 |
| ARSENIC | GH-47B | ug/l | No Trend | -0.1965# | Exceedance | 8.643 | 0.02 | NR | |
| ARSENIC | GH-4A | ug/l | Upward | 2.346# | Exceedance | 23.42 | 0.02 | NR | |
| ARSENIC | GH-4B | ug/l | No Trend | 0# | Exceedance | 9.057 | 0.02 | No Change | 10 |
| ARSENIC | GH-50 | ug/l | No Trend | -0.02746# | Exceedance | 69.41 | 0.02 | Better | 98.32 |
| ARSENIC | GH-50A | ug/l | No Trend | 0.02664# | Exceedance | 41.05 | 0.02 | Worse | 21.1 |
| ARSENIC | GH-50B | ug/l | No Trend | 0# | Exceedance | 10.76 | 0.02 | Better | 20.5 |
| ARSENIC | GH-51 | ug/l | No Trend | 0.04833# | Exceedance | 108.4 | 0.02 | Worse | 107.8 |
| ARSENIC | GH-53 | ug/l | Downward | -0.09697# | Exceedance | 68.62 | 0.02 | No Change | 89.3 |
| ARSENIC | GH-55 | ug/l | Downward | -0.05987# | Exceedance | 55.63 | 0.02 | Better | 83.72 |
| ARSENIC | GH-57 | ug/l | No Trend | 0.03697# | Exceedance | 55.98 | 0.02 | No Change | 57.3 |
| ARSENIC | GH-59 | ug/l | Upward | 0.1228# | Exceedance | 116 | 0.02 | No Change | 202.3 |
| ARSENIC | GH-66 | ug/l | Downward | -0.09015# | Exceedance | 69.53 | 0.02 | Better | 116 |
| ARSENIC | GH-67 | ug/l | Downward | -0.05595# | Exceedance | 77.99 | 0.02 | No Change | 125.1 |
| ARSENIC | GH-68 | ug/l | Downward | -0.1189# | Exceedance | 66.15 | 0.02 | No Change | 93.4 |
| ARSENIC | GH-69 | ug/l | Downward | -0.1711# | Exceedance | 53.99 | 0.02 | Better | 124.6 |
| ARSENIC | GH-6A | ug/l | No Trend | 0# | Exceedance | 8.164 | 0.02 | No Change | 10 |
| ARSENIC | GH-6B | ug/l | Downward | -0.2941# | Exceedance | 13.67 | 0.02 | Better | 85.92 |
| ARSENIC | GH-78 | ug/l | Upward | 0.5481# | Exceedance | 46.89 | 0.02 | NR | |
| ARSENIC | GH-79 | ug/l | Downward | -0.09574# | Exceedance | 39.21 | 0.02 | Better | 67.14 |
| ARSENIC | GH-7A | ug/l | Upward | 0.4074# | Exceedance | 72.9 | 0.02 | Worse | 49.24 |
| ARSENIC | GH-81 | ug/l | Downward | -0.09394# | Exceedance | 32.3 | 0.02 | Better | 65.69 |
| ARSENIC | GH-83 | ug/l | Downward | -0.05404# | Exceedance | 105.3 | 0.02 | Better | 163.5 |
| ARSENIC | GH-8B | ug/l | No Trend | 0# | Exceedance | 9.95 | 0.02 | No Change | 10 |
| ARSENIC | GH-9A | ug/l | Downward | -0.08515# | Exceedance | 32.4 | 0.02 | No Change | 93.33 |
| ARSENIC | GH-9B | ug/l | No Trend | -0.008832# | Exceedance | 70.6 | 0.02 | Worse | 78.77 |
| ARSENIC | GW-1 | ug/l | No Trend | 0# | Exceedance | 35.65 | 0.02 | No Change | 31.51 |
| ARSENIC | GW-10 | ug/l | No Trend | -0.07037# | Exceedance | 8.744 | 0.02 | Better | 22 |
| ARSENIC | GW-11 | ug/l | No Trend | 0# | Exceedance | 5.649 | 0.02 | No Change | 10 |
| ARSENIC | SW-101 | ug/l | No Trend | 0# | Exceedance | 19.73 | 0.02 | NR | |

## Attachment 5

Federal ARARs

The major ARARs that will be addressed and met by the selected remedy and whether the ARARs are listed as follows:

Executive Order 11988 and 11990; 40 CFR 6, Subpart A which requires that remedial actions must avoid adverse affects to floodplain or wetlands and evaluate potential impacts to these areas.

The Clean Air Act and 40 CFR 50 and 52 which require that select types and quantities of air emissions be in compliance with regional air pollution control programs; approved State Implementation Plans and other appropriate federal air criteria.

40 CFR 141 which requires that ground water used as drinking water meet maximum contaminant levels (MCLs) for pollutants of concern.

40 CFR 144 and 146 well plugging and abandonment and other requirements for the injection of treated ground water under the Underground Injection Control Program.

40 CFR 268 Land Disposal Restrictions for the handling, treatment, and placement of hazardous wastes.

49 CFR 107 requirements for transporting hazardous materials off-site.

40 CFR 761 TSCA regulations for the treatment, storage, and handling of PCBs.

## Attachment 6

State ARARs

Act 60 of 1976 (PCB Compounds) which prohibits the disposal of waste containing a concentration equal or greater than 100 ppm of PCBs.

Act 64 of 1979 (The Hazardous Waste Management Act) which regulates the treatment, transport and disposal of hazardous wastes from site restoration.

Act 98 of 1913 (The Waterworks and Sewerage Systems Act) which are rules for construction and operation of sewerage systems, as applicable for discharge of ground water via new sewer connection and certification of the operator.

Act 127 of 1970 (The Michigan Environmental Protection Act) which prohibits any action which pollutes, impairs, or destroys the State's natural resources, due to any remedial action at the site.

Act 203 of 1979 (The Goemare-Anderson Wetland Protection Act) which regulates discharges to wetlands.

Act 245 of 1929 (The Water Resources Commission Act), as amended, which establishes surface water-quality standards to protect human health and the environment. The State administers the NPDES program under Part 21 of Michigan Act 245; therefore, Part 21 of Act 245 would be applicable to the direct discharge of treated water to the Clinton River or to a clean aquifer, to the indirect discharge through groundwater movement to a surface water body, or to discharge to a POTW.

Act 307 of 1990 (The Michigan Environmental Response Act) which provides for response activity to eliminate environmental contamination as sites containing hazardous substances and establishes cleanup standards.

Act 315 of 1969 (The Mineral Well Act) which establishes requirements for monitoring wells at the site.

Act 346 of 1972 (The Inland Taking and Streams Act), as amended, which regulates inland lakes and streams in the State.

Act 347 of 1972 (The Soil Erosion and Sedimentation control Act) which requires a soil erosion control measures at the site consistent with locally approved soil sedimentation and erosion control plans or rules.

Act 348 of 1965 (The Air Pollution Act) which requires air emissions to have 'non-injurious effects."

Act 641 of 1978 (The Solid Waste Management Act) which establishes provisions governing the

regulation and management of solid waste.

Public Health Code Act 368 which establishes the procedures for well abandonment.

**Institutional Control (IC) Review**
Required Institutional Controls

**Superfund**
**U.S. Environmental Protection Agency**

## G&H Landfill
## Macomb County, MI

**MID980410823**


**Legend ***

- PRP Site Boundary
- Estate of Leonard Forster
- Deed Restrictions (1991) - Required IC
- Auto Disposal Yard
- Watermain Easements

0 300 600 Feet

N

GEOS
Groundwater Evaluation and Optimization System

* Please see Attachment 8 for Summary of Institutional Controls

EPA Disclaimer: Please be advised that areas depicted in the map have been estimated. The map does not create any rights enforceable by any party. EPA may refine or change this data and map at any time.

Created by Sarah Backhouse
U.S. EPA Region 5 on 9/22/06

Attachment 7

Attachment 8 DEED RESTRICTIONS ON G & H LANDFILL SITE

The Estate of Leonard Forster, owner in fee simple of the real estate described below, hereby imposes restrictions on the described real estate, also known as the G & H Industrial Landfill Site (hereafter "the Site") in Shelby Township, Macomb County, State of Michigan:

Beginning at Northeast corner Section 19, Town 3 North, Range 12 East, thence South 993.3 feet; thence South 89 degrees 55 minutes West 792 feet; thence South 220 feet; thence North 89 degrees 55 minutes East 396 feet; thence South 412.23 feet to R/W Michigan Central Railroad; thence Northwesterly along Railroad to South line of North 1/2 of North 1/2; thence West along 1/8 line to center line of Clinton River thence Northwesterly along River to North line of Section; thence East along Section line to point of beginning; except Michigan Central Railroad R/W. Subject to a 12 foot watermain easement, the center line description as, beginning at a point South 40 feet and West 30 feet from Northeast corner Section 19, thence West 1370 feet to the point ending, along with a 20 foot watermain easement, the center line description as beginning 1370 feet West of Northeast corner Section 19; thence South 34 feet to point of ending.

The restrictions enumerated herein also apply to the specific portion of the Site known as the Auto Disposal Yard, or Junkyard, bordered immediately to the northeast by the intersection of 23-Mile Road and Ryan in Shelby Township, Macomb County, Michigan. The legal description of the Auto Disposal Yard is:

Beginning at the N.E. Corner of Section 19, T.3N., R.12E., Shelby Township, Macomb County, Michigan; thence Due South 993.30 feet along the East line of Section 19 and the centerline of Ryan Road; thence S.89°55'00"W., 400.00 feet; thence Due North, 990.51 feet to a point on the North line of Section 19; thence N.89°31'01"E., 400.01 feet along the North line of Section 19 and the centerline of 23 Mile Road to the Point of Beginning and containing 9.11 acres.
The following restrictions are imposed upon the Site, its present and any future owners (including the hairs to the Estate) their authorized agents, assigns, employees or persons acting under their direction or control, for the purposes of protecting public health or welfare and the environment, preventing interference with the performance, and the maintenance, of any response actions selected and/or undertaken by the United States Environmental Protection Agency ("U. S. EPA"), or any party acting as agent for U.S. EPA, pursuant to Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"). Specifically, the following deed restrictions shall apply to the Site as provided for in paragraph nine (9) of the Consent Decree:

1. There shall be no consumptive or other use of the groundwater underlying the Site that could cause exposure of humans or animals to the groundwater underlying the Site;

2. There shall be no residential, commercial, or agricultural use of the Forster property considered part of the Site, including, but not limited to, any filling, grading, excavating,

building, drilling, mining, farming, or other development, or placing of waste material at any portion of the Site, including, but not limited to, the Auto Disposal Yard as described above, for any purpose, including residential, commercial, or agricultural purposes, except as approved in writing, by U.S. EPA;

3. There shall be no use of the Site that would allow the continued presence of humans at the Site, other than the presence necessary for implementation of any response actions selected and/or undertaken by U.S. EPA pursuant to Section 104 of CERCLA, including such response actions taken by other responsible parties under a judicial or administrative order. A prohibited use of the Site includes, but is not limited to, recreational use;

4. There shall be no installation, removal, construction or use of any buildings, wells, pipes, roads, ditches or any other structures or materials at the Site except as approved, in writing, by U.S. EPA, and in consultation with the State of Michigan;

5. There shall be no tampering with, or-removal of, the containment or monitoring systems that remain on the Site as a result of implementation of any response action by U.S. EPA, or any party acting as agent for U.S. EPA, and which is selected and/or undertaken by U.S. EPA pursuant to Section 104 of CERCLA; and

6. There shall be no use of, or activity at, the Site that may interfere with, damage, or otherwise impair the effectiveness of any response action (or any component thereof) selected and/or undertaken by U.S. EPA, or any party acting as agent for U.S. EPA, pursuant to Section 104 of CERCLA, except with the written approval of U.S. EPA, in consultation with the State of Michigan, and consistent with all statutory and regulatory requirements.

The obligation to implement and maintain the above restrictions shall run with the land and shall remain in effect until such time as U.S. EPA files with the Court a written certification stating:

1. The response action required at, under or adjacent to the Site by any Consent Decree or judicial or administrative order, entered pursuant to CERCLA, has been fully implemented;

2. No other response actions are planned for the Site; and

3. The above restrictions are no longer necessary to meet the purposes of this Decree.